

### **REMARKS**

Responsive to the Final Office Action dated September 9, 2003, Applicant has amended Claims 12, 14, 17, 20, 21, and 24. Claims 1-11 have been withdrawn from further consideration as being directed to a nonelected invention. Claims 13, 15-16, 19, 22 and 23 have previously been cancelled. Accordingly, Claims 12, 14, 17, 20, 21, 24, and 25-27 are currently pending with Claims 12 and 25 being independent.

#### **I. Summary of the Claims**

Independent Claim 12, as amended, recites a method for manufacturing a carbonaceous complex structure. The method includes the step of forming a carbonaceous thin film on a smooth surface of a substrate. The method also includes the step of forming a fullerene polymer film on the carbonaceous thin film.

Independent Claim 25 also recites a method for manufacturing a carbonaceous complex structure. This method includes the step of forming a first electrode having a surface with a roughness Ra set to not larger than 1  $\mu\text{m}$  on a substrate. The next step includes forming a carbonaceous thin film on the surface of the first electrode, and then forming a fullerene polymer film on the thus formed carbonaceous thin film. Finally, a second electrode is formed on the thus formed fullerene polymer film.

#### **II. Allowable Subject Matter**

Applicant appreciates the Examiner's allowance of Claims 25 and 26.

#### **III. The § 103(a) Rejection**

Claims 12, 14, 17, 20-21, 24 and 27 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,277,996 to Marchetti et al. alone or when taken in view of Banks. First, Applicant respectfully traverses the rejection of dependent Claim 27 as obvious. Claim 27 depends from Claim 25 which has been allowed. Applicant therefore requests

allowance of dependent Claim 27. Second, Applicant respectfully submits that the present invention as claimed in Claims 12, 14, 17, 20, 21 and 24 is not obvious under § 103(a) and requests reconsideration and withdrawal of this rejection for the following reasons.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Marchetti does not teach or suggest the present invention as claimed. In particular, Marchetti does not teach or suggest the use of a fullerene polymer film. To the contrary, Marchetti describes electrodes for fuel cells. The electrodes are comprised of three layers: a carbon substrate layer 30, a fullerene anchor layer 36, and a platinum catalyst layer 37. However, the fullerene anchor layer is not a fullerene *polymer* film, but a layer of fullerene *molecules*. For example, Marchetti teaches that: (1) "the electrodes are formed from . . . C<sub>60</sub> molecules or fullerenes . . .," (Abstract); (2) "[t]he foregoing objects are met by an improved fuel cell electrode containing fullerene molecules coated with platinum . . .," (col. 2, l. 66 - col. 3, l. 1); and (3) "[t]he molecules of the fullerene layer hold clumps of lattice structure platinum atoms . . .," (col. 3, lines 21-22).

Moreover, when comparing the teachings of Marchetti with the instant claims, it is important to correctly identify each element of the inventions. For example, the fuel chamber or the oxidant chamber described in Marchetti generally corresponds to the substrate of Applicant's

claims. The carbon substrate layer described in Marchetti generally corresponds to the carbonaceous thin film of Applicant's claims. At column 3, lines 7-17, Marchetti teaches that "[t]he electrodes are composed of substantially planar adjacent layers." These layers include a carbon substrate layer [carbonaceous thin film] in physical contact with either the fuel chamber or the oxidant chamber [substrate]. "Next, an anchor layer composed of C60 . . . Finally, a platinum layer serving as the catalyst of the reduction/oxidation reaction . . . ."

In the method for manufacturing fuel cells taught by Marchetti, in a first step, the electrodes are made and, in a second step, the electrodes are placed next to either a fuel chamber 10 or an oxidant chamber 14. Marchetti states that "[t]he anode 6 is placed between the electrolyte matrix and the gas or fuel chamber 10 . . . Cathode 8 placed between the electrolyte matrix 4 and the oxidant chamber . . . ." (Col. 4, lines 4-10).

Accordingly, the method for making the fuel cells described in Marchetti would not have rendered obvious a method for making a complex structure by first forming a carbonaceous thin film on a substrate and then forming a fullerene polymer film on the thus-formed carbonaceous thin film. In Marchetti, the multi-layer electrode containing the carbonaceous thin film [carbon substrate layer] and the fullerene layer is first manufactured. Only after the fullerene layer is formed on the carbonaceous film [carbon substrate layer] is the carbonaceous film [carbon substrate layer] placed next to the substrate [fuel chamber of the oxidant chamber]. Contrary to the examiner's assertion that the fibrous carbon material reads on a carbonaceous thin film, nothing in Marchetti would have suggested forming the layer of fibrous carbon material on the fuel chamber or the oxidant chamber [substrate] and then forming the fullerene carbon layer on the fibrous carbon material [carbonaceous thin film].

Finally, prima facie obviousness requires that there must be a reasonable expectation of success when prior art is modified or combined. In the present application, there is no

reasonable expectation of success in achieving the invention as claimed when the cited reference to Marchetti is modified much less when it is combined with Banks. As discussed above, the cited reference does not contain *all* the elements of Applicants' independent claims. Unless all the elements are taught by the reference, there can be no success in modifying it

Thus, at the time the present invention was made, neither Marchetti nor Banks teach or describe *all* of the limitations claimed by Applicant in its independent claim and the claims depending therefrom. Accordingly, independent claim 12 and the claims depending therefrom are nonobvious under § 103 (a).

#### IV. Conclusion

Applicant respectfully requests withdrawal of the rejections and objection and believes that the claims, as amended, present allowable subject matter. However, if the Examiner desires, the applicant is ready for a telephone interview to expedite prosecution. As always, the Examiner is free to call the undersigned at 816.460.2516. Should any fees be necessitated by this response, the Commissioner is hereby authorized to deduct any such fees from Deposit Account No. 19-3140.

Respectfully submitted,

SONNENSCHNEIN NATH & ROSENTHAL LLP

By



Lara Dickey Lewis, Reg. No. 48,161  
P.O. Box 061080  
Wacker Drive Station, Sears Tower  
Chicago, IL 60606-1080  
816-460-2516 (telephone)  
816-531-7545 (facsimile)

ATTORNEYS FOR APPLICANT